

**Amendments to the Specification:**

On page 1, line 1 of the specification (following invention title), please insert the following new section:

**--Related Applications**

The present application is a 35 U.S.C. §371 national stage filing of International Patent Application No. PCT/CN2003/000095, filed January 28, 2003, through which and to which priority is claimed to Chinese Priority Patent Application No. 02160524.6, filed December 27, 2002.--

On page 1, please substitute the second full paragraph with the following paragraph:

--*Tripterygium Wilfordii* Hook f (Lei Gong Teng) is a kind of vine plant of the Celastraceae family, and mainly grows under humid conditions ~~circumstance~~ near the forest in the Yangtze River basin and southeast area of China. Its major chemical components include diterpenes, triterpenes, sesquiterpenes, alkaloids and so on. ~~The pharmacological study~~ Pharmacological studies conducted in the last twenty years demonstrated that the extract of *Tripterygium Wilfordii* Hook f has anti-flammable, immunosuppressive, male sterile, anti-tumor and antibacterial activities. One diterpenoid lactone in *Tripterygium Wilfordii* Hook f, triptolide ~~(shown below), f shown as the following figure, triptolide,~~ was found to have significant biological activity, especially in respect to its ~~of~~ inhibiting immune function.--

On page 1, please substitute the third full paragraph with the following paragraph:

-- However, the high toxicity of triptolide limited its clinic uses, and after studying the structure-activity relationship of triptolide thoroughly, the present inventors designed and synthesized a series of novel triptolide derivatives through chemical modification on structure moiety of this lead compound to complete the present ~~this~~ invention.--

On page 1, please substitute the fourth full paragraph with the following paragraph:

-- Therefore, ~~one of the purposes of~~ the present invention provides ~~is to provide~~ highly bioactive triptolide derivatives with low toxicity.--

On page 1, please substitute the fifth full paragraph with the following paragraph:

--~~Another purpose of the~~ The present invention also provides ~~is to provide~~ the application of ~~these~~ triptolide derivatives in preparing anti-flammable agents, ~~agent~~, immunosuppressant agents ~~agent~~ and other pharmaceutical compositions used in treating related diseases.--

On page 2, please substitute the second full paragraph with the following paragraph:


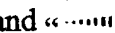
-- When C-5 and C-6 are connected by single bond, X and Y independently represent hydrogen, oxygen, hydroxyl, halogen, alkoxy, mercapto, -NR<sub>1</sub>R<sub>2</sub>, -SR, -OCOR, -OSO<sub>2</sub>OR, or -

OPO(OH)<sub>2</sub> linked to C-5 or C-6, wherein R represents -(CH<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>Na, -(CH<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>K or -(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub>, and n=1-6;--

On page 2, please substitute the third full paragraph with the following paragraph:

-- Z represents hydrogen, oxygen, hydroxyl, halogen, alkoxy, mercapto, -NR<sub>1</sub>R<sub>2</sub>, -SR, -OCOR, -OSO<sub>2</sub>OR, or -OPO(OH)<sub>2</sub> linked to C-14, wherein R represents -(CH<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>Na, -(CH<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>K ~~or~~ or -(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub>, n=1-6;--

On page 2, please substitute the fourth full paragraph with the following paragraph:

-- In the above formula (1), “—” that attaches to “X”, “Y” and “Z” represents the stereochemistry orientations “” and “” as well;--

On page 2, please substitute the sixth full paragraph with the following paragraph:

-- The present invention also provides the application of triptolide derivatives as represented by the formula (I), in preparing antinflamable agents, ~~agent~~, immunosuppressant agents ~~agent~~ and other pharmaceutical compositions used in treating related diseases.--

On page 2, please substitute the eighth full paragraph with the following paragraph:

-- The first type of compounds of ~~in~~ the present invention ~~preferred~~ are triptolide derivatives represented by formula (1), where the configuration of X is a (R), that of Y is R or S, and Z is  $\beta$ -OH(R) shown as formula (2):--

On page 3, please substitute the second full paragraph with the following paragraph:

-- The second type of compounds of ~~in~~ the present invention ~~preferred~~ are triptolide derivatives represented by formula (1), where the configuration of X is  $\alpha$  (R) that of Y is R or S, and Z is  $\alpha$  -OH(S) shown as formula (3):--

On page 3, please substitute the fourth full paragraph with the following paragraph:

-- The third type of compounds of ~~in~~ the present invention ~~preferred~~ are triptolide derivatives represented by formula (1), where the configuration of X is a (R) that of Y is R or S, and Z is O shown as formula (4):--

On page 3, please substitute the sixth full paragraph with the following paragraph:

-- The fourth type of compounds of ~~in~~ the present invention ~~preferred~~ are triptolide derivatives represented by formula (1), where C-5 and C-6 are connected by double bond, and the configuration of Z is R or S, or Z is O shown as formula (5):--

On page 4, please substitute the first full paragraph with the following paragraph:

-- The synthetic route used to produce the of triptolide derivatives according to in the present invention is shown as below:--

On pages 4 and 5, please substitute the paragraph bridging pages 4 and 5 with the following paragraph:

-- In this synthetic route, triptonide, which was used ~~taken~~ as the starting material was heated with selenium dioxide hydroxylation in nonprotonic polar solvent to give (5R)-5-hydroxytriptonide (LLDT-13), and then reduced in polar protonic solvent to afford (5R)-5-hydroxytriptolide (LLDT-8) and (5R)-5-hydroxy-14-epitriptolide (LLDT-14). Dehydration of (5R)-5-hydroxytriptonide with trifluoroacetic acid anhydride in nonprotic polar solvent gave  $\Delta^{5,6}$ -dehydrotriptonide (LLDT-15), which was then reduced in polar proton solvent to produce  $\Delta^{5,6}$ -dehydrotriptolide (LLDT-18) and  $\Delta^{5,6}$ -dehydro-14-epitriptolide (LLDT-19).  $\Delta^{5,6}$ -Dehydrotriptonide was reacted with peroxide in polar solvent to give (5R, 6S)-5,6-epoxytriptonide (LLDT-16) by introducing epoxy function group between C-5 and C-6, and was then reduced in polar protonic solvent to provide (5R, 6S)-5,6-epoxytriptolide (LLDT-20) and (5R, 6S)-5,6-epoxy-14-epitriptolide (LLDT -21). Dihydroxylation of  $\Delta^{5,6}$ -dehydrotriptonide catalysed by osmium tetroxide or osmic acid in polar solvent provided cis-(5R, 6S)-5,6-dihydroxytriptonide (LLDT-17), which was then reduced in protonic polar solvent to give cis-

(5R, 6S)-5,6-dihydroxytriptolide (LLDT-22) and cis-(5R, 6S)-5,6-dihydroxy-14-epitriptolide (LLDT -23).--

On page 5, please substitute the second full paragraph with the following paragraph:

--“Lower alkyl” refers to ~~the~~ branched or linear alkyl groups having ~~with~~ one to six carbon atoms;--

On page 5, please substitute the third full paragraph with the following paragraph:

--“Alkoxy” refers to methoxy, ethoxy, propoxy, isopropoxy, *n*-butoxy, *iso*-butoxy, *sec*-butoxy, *tert*-butoxy, *n*-pentoxy, *iso*-pentoxy, *tert*-pentoxy, neo-pentoxy, 2-methyl-butoxy, 1, 2-dimethylpropoxy, 1-ethylpropoxy, hexoxy, where methoxy and ethoxy are ~~were~~ preferred;--

On page 5, please substitute the fourth full paragraph with the following paragraph:

--“Alkylamino” refers to methylamino, ethylamino, propylamino, isopropylamino, *n*-butylamino, *iso*-butylamino, *sec*-butylamino, *tert*-butylamino, *n*-pentylamino, *iso*-pentylamino, *tert*-pentylamino, neo-pentylamino, 2-methylbutylamino, 1, 2-dimethyl-propylamino, 1-ethylpropylamino, hexylamino and dimethylamino, diethylamino, dipropylamino, diisopropylamino, dibutylamino, diisobutylamino, where methylamino, ethylamino and dimethylamino, diethylamino are ~~were~~ preferred;--

On page 5, please substitute the fifth full paragraph with the following paragraph:

--“alkyl sulfide” refers to methylsulfide, ethylsulfide, propylsulfide, isopropylsulfide, *n*-butylsulfide, *iso*-butylsulfide, *sec*-butylsulfide, *tert*-butylsulfide, *n*-pentylsulfide, *iso*-pentyl sulfide, *tert*-pentylsulfide, neo-pentylsulfide, 2-methylbutylsulfide, 1, 2-dimethylpropylsulfide, 1-ethylpropylsulfide, hexylsulfide, where methylsulfide and ethylsulfide are ~~were~~ preferred;--

On page 5, please substitute the sixth full paragraph with the following paragraph:

--“Polar solvent” refers to ~~the~~ solvents including ethyl acetate, 1, 4-dioxane, acetone, *t*-butanol and so on;--

On page 5, please substitute the seventh full paragraph with the following paragraph:

--“Nonprotonic polar solvent” refers to ~~the~~ solvents including dimethyl sulfoxide, N, N-dimethyl formamide, dichloromethane, chloroform, tetrahydrofuran, 1, 4-dioxane, 1, 2-dimethyl glycol ether and so on;--

On page 6, please substitute the first full paragraph with the following paragraph:

--“Protonic polar solvent” refers to ~~the~~ solvents including methanol, ethanol, propanol, *t*-

butanol and so on;--

On page 6, please substitute the second full paragraph with the following paragraph:

--“Heating condition” refers to a ~~the~~ temperature from above room temperature to reflux;--

On page 6, please substitute the third full paragraph with the following paragraph:

--“Peroxydizing reagent” refers to ~~the~~ reagents including m-chloroperoxybenzoate acid, *t*-peroxybutanol, peroxide hydrogen and so on;--

On page 6, please substitute the fourth full paragraph with the following paragraph:

-- The term “pharmaceutically acceptable salt” encompasses carboxylate salts having organic and inorganic cations, such as alkali and alkaline earth metal cations (for example, sodium, potassium, calcium, and ~~aluminium~~), aluminum), ammonium, or organic cations, (for example, methyl ammonium, ethyl ammonium, 2-hydroxyethyl ammonium), and the like which can be obtained by reactions ~~reacting~~ with acid organic acids which include propionic, oxalic, malonic, succinic, maleic, fumaric, lactic, malic, tartaric, citric, aspartic, glutamic acid and the like or the ammonium salts which can be obtained by reacting with lysine, arginine, ornithine and then hydrochloric, hydrobromic, hydrofluoric, nitric, sulfuric, phosphoric, formic, acetic, picric,



methanesulfonic, ethane sulfonic acid.--

On page 6, please substitute the seventh full paragraph with the following paragraph:

-- All sorts of medical or pharmaceutical agents containing the effective dosage of triptolide derivatives of the present invention may be used ~~sued~~ on the treatment of the patient according to the age, health condition, the degree of severity and duration ~~time~~ of the patients, administrative methods and individual drug sensitivity.--

On page 7, please substitute the seventh full paragraph with the following paragraph:

--Figure 12 shows ~~the photos on~~ the preventive effect of LLDT-8 on adjuvant arthritis of rats. In the figure, A) control; B) adjuvant arthritis; C)-E) LLDT-8: 3mg/kg, 1mg/kg, 0.2mg/kg; F) CsA10mg/kg.--

On page 7, please substitute the fourteenth full paragraph with the following paragraph:

--Figure 19 shows ~~the photos on~~ the therapeutic effect of LLDT-8 on collagen-induced arthritis in DBA/1 mice.--

On page 8, please substitute the second full paragraph with the following paragraph:

--To a solution of triptonide (374mg, 1.04mmol) in DMSO (20ml) was added SeO<sub>2</sub> (461mg, 4.16mmol). The mixture was gently refluxed for 10 hours. Then the mixture was cooled down to room temperature, filtered through a short pad of silicon gel, rinsed with ethyl acetate. The solvent was removed under reduced pressure. Ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> were added to the residue. ~~The residue was added ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub>.~~ After vigorous extraction, the organic layer was washed with water and brine, dried with anhydrous sodium sulfate. After concentration, the residue was purified by flash column chromatography to provide (5R)-5-hydroxytriptonide in 82% yield (319mg, 0.85mmol).--

On pages 9 and 10, please substitute the paragraph bridging pages 9 and 10 with the following paragraph:

--(5R)-5-hydroxytriptonide (224mg, 0.60mmol) was dissolved in dichloromethane (10ml) combined with pyridine (4ml, 50.57~~mmol~~), then mmol), then the mixture was added dropwise TFAA (600mg, 2.85mmol) and stirred for 12 hours. After removal of the solvent under reduced pressure, the residue was diluted with water, then extracted with ethyl ~~acetate~~ the acetate. The organic layer was washed with 1M H<sub>2</sub>SO<sub>4</sub>, saturated NaHCO<sub>3</sub>, water and brine, dried with anhydrous sodium sulfate. After concentration, the residue was purified by flash column chromatography to provide Δ<sup>5,6</sup>-dehydrotriptonide in 75% yield (166mg, 0.47mmol).--

On page 15, please substitute the first full paragraph with the following paragraph:

--In the following experiments, LLDT -8 was presented by Department of Medicinal Chemistry (Shanghai Institute of Materia Medica, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences) and is >99% pure. ~~pure by reverse phase high performance liquid.~~ LLDT-8 is composed of white amorphous powder. The parent compound of LLDT-8, LLDT-2 was also used as control.--

On page 15, please substitute the fourth full paragraph with the following paragraph:

-- Bovine ~~bovine~~ type II collagen (0418N) was purchased from Collagen Research Center (Tokyo, Japan).--

On page 19, please substitute the second full paragraph with the following paragraph:

-- Splenocytes from responder (C57BL/6) were mixed with stimulator (Balb/c), which was pretreated with <sup>60</sup>Co Gamma Ray irradiation (3000 rads).--

On page 21, please substitute the last full paragraph with the following paragraph:

--(1) ~~Pretreated the~~ The Tuf-tainer (non-adherent to cells) was pretreated with culture medium for 2 h;--

On page 22, please substitute the second full paragraph with the following paragraph:

--(3) ~~Added cells and~~ Cells were added to 5 µg/ml ConA or medium;--

On page 22, please substitute the third full paragraph with the following paragraph:

--(4) ~~Cultured~~ The cells were cultured in 5% CO<sub>2</sub> incubator at 37°C for 24-96 h;--

On page 22, please substitute the fifth full paragraph with the following paragraph:

--(6) ~~Shaked~~ The collected cells were shaken 10s violently and ~~added~~ 1 ml ice-cold 70% ethanol was added dropwise, ~~droply,~~ capped and fixed overnight at 4°C;--

On page 22, please substitute the sixth full paragraph with the following paragraph:

--(7) ~~Centrifugated~~ The cells were centrifuged at 3000 rpm for 5 min and ~~removed~~ the ethanol was removed; ~~ethanol;~~ Incubated cells with 1 ml PI staining buffer at room temperature more than 30 min; FACs analysis was performed with 24 h.--

On page 26, please replace the second full paragraph with the following paragraph:

--Prepared mouse spleen cell suspension at  $2 \times 10^7/\text{ml}$  was provided;--



On page 32, please substitute the last full paragraph with the following paragraph:

-- ~~The~~ During the course of the present invention it was determined that the derivatives,  
~~derivatives in the present invention,~~ especially LLDT-8, or their combinations can be used ~~explored~~  
as ~~immunosuppressant~~ immunosuppressants for prevention and therapy against autoimmune diseases  
(arthritis, systemic lupus erythematosus, chronic nephritis, diabetes); inflammatory diseases (AIDS,  
virus hepatitis); allergy; skin diseases, cardiovascular diseases and transplant rejection, as well as  
anti-fertility and immune related diseases.--

Please cancel pages 33-43 as these pages contain figures that will be attached to the  
specification as drawings for the application.

On page 46, please amend the Abstract as follows:

--~~The invention relates to triptolide~~ Triptolide derivatives of Formula (I), their  
pharmaceutically acceptable salts and optical isomers, Formula (I):

wherein, C5 and C6 are connect with each other by a C-C single bond or double bond; when C5 and C6 are connected with C-C single bond, X and Y represent ~~represents~~ independently hydrogen, oxygen, hydroxyl, halogen, lower alkyl-oxy, lower alkyl-amino, mercapto, lower alkyl-thio, the group of formula -OCOR, -OSO<sub>2</sub>OR or -OPO(OH)<sub>2</sub>, each of which is attached to C5 and C6, R represents -(CH<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>Na, -(CO<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>K, or -(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub>, wherein n = 1-6; Z represents hydrogen, oxygen, hydroxyl, halogen, lower alkyl-oxy, lower alkyl-amino, mercapto, lower alkyl-thio, the group of formula -OCOR, -OSO<sub>2</sub>OR or -OPO(OH)<sub>2</sub>, each of which is linked at C14-position, R represents -(CH<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>Na, -(CO<sub>2</sub>)<sub>n</sub>CO<sub>2</sub>K, or -(CH<sub>2</sub>)<sub>n</sub>CH<sub>2</sub>, wherein n = 1-6; wherein, the“      ” linked with X, Y, and Z represents the stereochemistry orientations “” or “”, but X and Y cannot both be hydrogen atom at the same time. Methods ~~time, the methods~~ for preparing the triptolides ~~them~~ and their use as antiphlogistic agent, immunosuppressive agent or therapeutic agent for other related diseases.--